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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/965,637	09/26/2001	Pasi Tikka	944-003.113	2477

4955 7590 06/21/2006

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EXAMINER	
NGUYEN, TUAN HOANG	
ART UNIT	**PAPER NUMBER**
2618	

DATE MAILED: 06/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/965,637	TIKKA ET AL.	
	Examiner	Art Unit	
	Tuan H. Nguyen	2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 March 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/9/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response To Arguments

1. Applicant's arguments, see applicant's remarks, filed on 03/13/2006, with respect to the rejection(s) of claim(s) 1-32 under 35 U.S.C § 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Gardner (US PAT. 6,466,803) and further in view Westergren et al. (US PAT. 5,423,076 hereinafter, "Westergren").

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 4, and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant admitted prior art in view of Aigner et al. (U.S PUB. 2003/0179053 hereinafter, "Aigner").

Consider claim 1, applicant admitted prior art in the specification discloses a dual-channel passband filtering device comprising: a first port (see specification page 2 lines 5-15, Fig. 1 item 924); a second port (see specification page 2 lines 5-15, Fig. 1 item 928); and a third port (see specification page 2 lines 5-15, Fig. 1 item 926), wherein at least one first passband filter (Fig. 1 Item 932) is connected between the first port and the second port (see specification page 2 lines 5-15, Fig. 1), and at least one second passband filter is connected between the second port and the third port via a phase shifter (see specification page 2 lines 5-15, Fig. 1 item 934), and wherein each of the first and second passband filters comprises: a first filter end having a first terminal (Fig. 1 Item 924) and a second terminal (Fig. 1 Item 928); a second filter end having a third terminal (Fig. 1 Item 926) and a fourth terminal (Fig. 1 the terminal of the second passband filter who connected to the Phase Shift Item 934); at least two series elements including a first and a second series element (see specification page 2 lines 5-15, Fig. 1 items 901, 903, 905).

The prior art differs does not explicitly show that for at least two shunt elements including a first and a second shunt element, wherein the first series element having a first end connected to the first terminal and a second end connected to the third terminal; the second series element having a first end connected to the second terminal and a second end connected to the fourth terminal; the first shunt element having a first end connected to the first terminal and a second end connected to the fourth terminal; and the second shunt element having a first end connected to the second terminal and a second end connected to the third terminal, and wherein each of the series and shunt elements includes an acoustic resonator.

In the same field of endeavor, Aigner teaches, for at least two shunt elements including a first and a second shunt element, wherein the first series element having a first end connected to the first terminal and a second end connected to the third terminal (see fig. 4 page 3 [0043]); the second series element having a first end connected to the second terminal and a second end connected to the fourth terminal (see fig. 4 page 3 [0043]); the first shunt element having a first end connected to the first terminal and a second end connected to the fourth terminal (see fig. 4 page 3 [0043]); and the second shunt element having a first end connected to the second terminal and a second end connected to the third terminal, and wherein each of the series and shunt elements includes an acoustic resonator (see fig. 4 page 3 [0043]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use for at least two shunt elements including a first and a second shunt element, wherein the first series element having a first end connected to

the first terminal and a second end connected to the third terminal; the second series element having a first end connected to the second terminal and a second end connected to the fourth terminal; the first shunt element having a first end connected to the first terminal and a second end connected to the fourth terminal; and the second shunt element having a first end connected to the second terminal and a second end connected to the third terminal, and wherein each of the series and shunt elements includes an acoustic resonator, as taught by Aigner, in order to provide a filter device constructed of a combined ladder and lattice filter topology. The filter device synergistically combines the good features of both types of filters. Using the filter device, an integrated unbalanced-to-balanced filter device can be realized, as taught by Aigner.

Consider claim 4, applicant admitted prior art in the specification discloses the acoustic resonators are bulk acoustic wave devices (page 1 lines 14-17).

Consider claim 7, applicant admitted prior art in the specification discloses the acoustic resonators are thin-film bulk acoustic resonators (page 1 lines 12-23).

Consider claim 8, applicant admitted prior art in the specification discloses the acoustic resonators are surface acoustic wave devices (page 2 lines 1-3).

5. Claims 2-3 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant admitted prior art in view of Aigner et al. (U.S PUB. 2003/0179053 hereinafter, "Aigner") as applied to claim 1 above, and further in view of Dailing et al. (U.S PAT. 3,727,154 hereinafter, "Dailing").

Consider claim 2, the applicant admitted prior art and Aigner, in combination, fails to teaches the first passband filter has a first passband frequency and the second passband filter has a second passband frequency different from the first passband frequency. However, Dailing teaches the first passband filter has a first passband frequency and the second passband filter has a second passband frequency different from the first passband frequency (col. 1 line 62 through col. 2 line 16). Therefore, it is obvious to one of ordinary skill in the art at the time the invention was made to incorporate the disclosing of Dailing into view of the applicant admitted prior art and Aigner, in order to provide an improved crystal filter circuit which allows for shaping of the passband of any chosen filter characteristic to a shape approaching the desired Gaussian curve in the passband while maintaining the original frequency attenuation characteristics outside the passband.

Consider claim 3, Dailing further teaches the first passband filter has a first passband frequency and the second passband filter has a second passband frequency and wherein the first and second passband frequencies are closely spaced in a frequency domain (col. 1 line 62 through col. 2 line 16).

Consider claim 9, Dailing further teaches a balun (Item 10) connected to the second port for receiving a single-ended antenna (see fig. 1 circuit 15).

Consider claim 10, Dailing further teaches a balun (Item 10) connected to the first port for providing a single-ended port for use in conjunction with a single-ended transceiver (see fig. 1 circuit 15).

Consider claim 11, Dailing further teaches a balun (Item 10) connected to the third port for providing a single-ended port for use in conjunction with a single-ended transceiver (see fig. 1 circuit 15).

6. Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant admitted prior art in view of Aigner et al. (U.S PUB. 2003/0179053 hereinafter, "Aigner") as applied to claim 1 above, and further in view of Ella (US PAT. 6,081,171).

Consider claim 5, the applicant admitted prior art and Aigner, in combination, fails to teaches at least one of the acoustic resonators is a bridge-type bulk acoustic wave device. However, Ella teaches at least one of the acoustic resonators is a bridge-type bulk acoustic wave device (col. 17 lines 16-23 fig. 1A & 1B). Therefore, it is obvious to one of ordinary skill in the art at the time the invention was made to incorporate the disclosing of Ella into view of the applicant admitted prior art and Aigner, in order to

improve frequency response characteristics relative to the Multi-pole Bulk Acoustic Wave Resonator Stacked Crystal Filter filtering circuit or device and includes a reduced number of passive components relative to the number of such components included in at least some conventional multi-pole filters.

Consider claim 6, Ella further teaches at least one of the acoustic resonators is a mirror-type bulk acoustic wave device (col. 18 lines 8-20 fig. 3A & 3B).

7. Claims 12, 22-24, 28, and 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant admitted prior art in view of Aigner et al. (U.S PUB. 2003/0179053 hereinafter, "Aigner") and further in view of Bradley et al. (EP 1,058,383 hereinafter, "Bradley").

Consider claim 12, applicant admitted prior art in the specification discloses each of the first and second passband filters comprising: a first filter end having a first terminal (see fig. 1 item 924) and a second terminal (see fig. 1 item 928); a second filter end having a third terminal (see fig. 1 Item 926) and a fourth terminal (see fig. 1 the terminal of the second passband filter who connected to the Phase Shift item 934); at least two series elements including a first and a second series element (see specification page 2 lines 5-15, fig. 1 items 901, 903, 905).

The prior art differs does not explicitly show that for at least two shunt elements including a first and a second shunt element, wherein the first series element having a

first end connected to the first terminal and a second end connected to the third terminal; the second series element having a first end connected to the second terminal and a second end connected to the fourth terminal; the first shunt element having a first end connected to the first terminal and a second end connected to the fourth terminal; and the second shunt element having a first end connected to the second terminal and a second end connected to the third terminal, and wherein each of the series and shunt elements includes an acoustic resonator.

In the same field of endeavor, Aigner teaches, for at least two shunt elements including a first and a second shunt element, wherein the first series element having a first end connected to the first terminal and a second end connected to the third terminal (see fig. 4 page 3 [0043]); the second series element having a first end connected to the second terminal and a second end connected to the fourth terminal (see fig. 4 page 3 [0043]); the first shunt element having a first end connected to the first terminal and a second end connected to the fourth terminal (see fig. 4 page 3 [0043]); and the second shunt element having a first end connected to the second terminal and a second end connected to the third terminal, and wherein each of the series and shunt elements includes an acoustic resonator (see fig. 4 page 3 [0043]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use for at least two shunt elements including a first and a second shunt element, wherein the first series element having a first end connected to the first terminal and a second end connected to the third terminal; the second series element having a first end connected to the second terminal and a second end

connected to the fourth terminal; the first shunt element having a first end connected to the first terminal and a second end connected to the fourth terminal; and the second shunt element having a first end connected to the second terminal and a second end connected to the third terminal, and wherein each of the series and shunt elements includes an acoustic resonator, as taught by Aigner, in order to provide a filter device constructed of a combined ladder and lattice filter topology. The filter device synergistically combines the good features of both types of filters. Using the filter device, an integrated unbalanced-to-balanced filter device can be realized, as taught by Aigner.

The applicant admitted prior art and Aigner, in combination, fails to discloses a front-end arrangement for use in a telecommunication device, comprising: an antenna port connected to an antenna system; a first port capable of conveying signals between a first transceiver connected to the first port and the antenna system via the antenna port; and a second port capable of conveying signals between a second transceiver connected to the second port and the antenna system via the antenna port, wherein at least one first passband filter is connected between the first port and the antenna port for filtering the signals conveyed between the first transceiver and the antenna system, and at least one second passband filter is connected between the second port and the antenna port via a phase shifter for filtering the signals conveyed between the second transceiver and the antenna system.

In the same field of endeavor, Bradley teaches, a front-end arrangement for use in a telecommunication device, comprising: an antenna port connected to an antenna

system (page 2 [0004]); a first port capable of conveying signals between a first transceiver connected to the first port and the antenna system via the antenna port (page 2 [0005] fig. 1); and a second port capable of conveying signals between a second transceiver connected to the second port and the antenna system via the antenna port, wherein at least one first passband filter is connected between the first port and the antenna port for filtering the signals conveyed between the first transceiver and the antenna system, and at least one second passband filter is connected between the second port and the antenna port via a phase shifter for filtering the signals conveyed between the second transceiver and the antenna system (page 2 [0005] fig. 1).

Therefore, it is obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Bradley into view of the applicant admitted prior art and Aigner, in order to provide communications applications, a common signal path is coupled both to the input of a receiver and the output of the transmitter.

Consider claim 22, applicant admitted prior art in the specification discloses the telecommunication device is a mobile phone (page 1 lines 28-29).

Consider claim 23, applicant admitted prior art in the specification discloses the telecommunication device is operated in a code-division multiple access mode (page 1 line 28 through page 2 line 3).

Consider claim 24, applicant admitted prior art in the specification discloses the telecommunication device is operated in a wideband code-division multiple access mode (page 1 line 28 through page 2 line 3).

Consider claim 28, applicant admitted prior art in the specification discloses the acoustic resonators are bulk acoustic wave devices (page 1 lines 14-17).

Consider claim 31, applicant admitted prior art in the specification discloses the acoustic resonators are thin-film bulk acoustic resonators (page 1 lines 12-23).

Consider claim 32, applicant admitted prior art in the specification discloses the acoustic resonators are surface acoustic wave devices (page 2 lines 1-3).

8. Claims 13-14, 20-21, and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant admitted prior art in view of Aigner et al. (U.S PUB. 2003/0179053 hereinafter, "Aigner") and Bradley et al. (EP 1,058,383 hereinafter, "Bradley") and further in view of Dailing et al. (U.S PAT. 3,727,154 hereinafter, "Dailing").

Consider claim 13, the applicant admitted prior art, Aigner, and Bradley in combination, fails to teaches the antenna port has a first port end and a second port end, and wherein the antenna system has a first antenna connected to the first port end,

and a second antenna connected to the second port end. However, Dailing teaches the antenna port has a first port end and a second port end, and wherein the antenna system has a first antenna connected to the first port end, and a second antenna connected to the second port end (see fig. 1 item 10 circuit 15). Therefore, it is obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Dailing into view of the applicant admitted prior art, Aigner, and Bradley in order to provide an improved crystal filter circuit which allows for shaping of the passband of any chosen filter characteristic to a shape approaching the desired Gaussian curve in the passband while maintaining the original frequency attenuation characteristics outside the passband.

Consider claim 14, Dailing further discloses the antenna system comprises an antenna connected to the antenna port via a balun (Fig. 1 Item 10 circuit 15).

Consider claim 20, Dailing further discloses the first passband filter has a first passband frequency and the second passband filter has a second passband frequency different from the first passband frequency (col. 1 line 62 through col. 2 line 16).

Consider claim 21, Dailing further discloses the first passband filter has a first passband frequency and the second passband filter has a second passband frequency, and wherein the first and second passband frequencies are closely spaced in a frequency domain (col. 1 line 62 through col. 2 line 16).

Consider claim 25, Dailing further discloses the first transceiver is a receiver and the first passband filter has a first passband frequency substantially in the range of 1805 MHz-1880 MHz, and wherein the second transceiver is a receiver and the second passband filter has a second passband frequency substantially in the range of 1930 MHz-1990 MHz (col. 1 line 62 through col. 2 line 16).

Consider claim 26, Dailing further discloses the first transceiver is a transmitter and the first passband filter has a first passband frequency substantially in the range of 1710 MHz-1785 MHz, and wherein the second transceiver is a receiver and the second passband filter has a second passband frequency substantially in the range of 1805 MHz-1880 MHz (col. 1 line 62 through col. 2 line 16).

Consider claim 27, Dailing further discloses the first transceiver is a transmitter and the first passband filter has a first passband frequency substantially in the range of 1850 MHz-1910 MHz, and wherein the second transceiver is a receiver and the second passband filter has a second passband frequency substantially in the range of 1930 MHz-1990 MHz (col. 1 line 62 through col. 2 line 16).

9. Claims 15-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant admitted prior art in view of Aigner et al. (U.S PUB. 2003/0179053 hereinafter,

"Aigner") and Bradley et al. (EP 1,058,383 hereinafter, "Bradley") as applied to claim 12 above, and further in view of Franca-Neto (U.S PAT. 6,721,544).

Consider claim 15, the applicant admitted prior art, Aigner, and Bradley in combination, fails to discloses the first transceiver is a transmitter and the second transceiver is a receiver. However, Franca-Neto teaches the first transceiver is a transmitter and the second transceiver is a receiver (col. 2 line 40 through col. 3 line 16 fig. 1). Therefore, it is obvious to one of ordinary skill in the art at the time the invention was made to incorporate the disclosing of Franca-Neto into view of the applicant admitted prior art, Aigner, and Bradley in order to practice reduces the overall cost of implementing an RF system by having radio frequency transmitter and receiver share a common antenna.

Consider claim 16, Franca-Neto further teaches the first transceiver is a receiver and the second transceiver is a transmitter (col. 2 line 40 through col. 3 line 16 fig. 1).

Consider claim 17, Franca-Neto further teaches both the first and the second transceivers are receivers (col. 2 line 40 through col. 3 line 16 fig. 1).

Consider claim 18, Franca-Neto further teaches the first transceiver is connected to the first port via a balun (col. 3 line 48 through col. 4 line 4 fig. 3).

Consider claim 19, Franca-Neto further teaches the second transceiver is connected to the second port via a balun (col. 3 line 48 through col. 4 line 4 fig. 3).

10. Claims 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant admitted prior art in view of Aigner et al. (U.S PUB. 2003/0179053 hereinafter, "Aigner") and Bradley et al. (EP 1,058,383 hereinafter, "Bradley") as applied to claim 12 above, and further in view of Ella (U.S PAT. 6,081,171).

Consider claim 29, the applicant admitted prior art, Aigner, and Bradley in combination, fails to teaches at least one of the acoustic resonators is a bridge-type bulk acoustic wave device. However, Ella teaches at least one of the acoustic resonators is a bridge-type bulk acoustic wave device (col. 17 lines 16-23 fig. 1A & 1B). Therefore, it is obvious to one of ordinary skill in the art at the time the invention was made to incorporate the disclosing of Ella into view of the applicant admitted prior art, Aigner, and Bradley in order to improve frequency response characteristics relative to the Multi-pole Bulk Acoustic Wave Resonator Stacked Crystal Filter filtering circuit or device and includes a reduced number of passive components relative to the number of such components included in at least some conventional multi-pole filters.

Consider claim 30, Ella further teaches at least one of the acoustic resonators is a mirror-type bulk acoustic wave device.

Conclusion

11. Any response to this action should be mailed to:

Mail Stop_____ (Explanation, e.g., Amendment or After-final, etc.)

Commissioner for Patents

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Facsimile responses should be faxed to:

(571) 273-8300

Hand-delivered responses should be brought to:

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan H. Nguyen whose telephone number is (571) 272-8329. The examiner can normally be reached on 8:00Am - 5:00Pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Maung Nay A. can be reached on (571) 272-7882. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information Consider the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tuan Nguyen
Examiner
Art Unit 2618

NAY MAUNG
SUPERVISORY PATENT EXAMINER